

## AMENDMENT

### LISTING OF CLAIMS

This Listing of Claims will replace all prior versions of claims in the application.

1. (Previously presented) A pH dependent ion exchange matrix, comprising:  
a solid support, and  
a plurality of ion exchange ligands, each first ion exchange ligand comprising:  
a cap comprising an amine with a pK of less than about 9;  
a spacer covalently attached to the cap, the spacer comprising a spacer alkyl chain with an amine terminus and an acidic moiety covalently attached to the spacer alkyl chain, wherein the acidic moiety is a carboxyl residue; and  
a linker comprising a linker alkyl chain covalently attached to the solid support at a first end of the linker alkyl chain and covalently attached to the amine terminus of the spacer at a second end of the linker alkyl chain;  
wherein the matrix has a capacity to adsorb to a target nucleic acid at a first pH, and to release the target nucleic acid at a desorption pH which is higher than the first pH.
2. (Original) The matrix of claim 1, wherein the solid support is a silica based material.
3. (Original) The matrix of claim 2, wherein the silica based material is a glass fiber.
4. (Original) The matrix of claim 2, wherein the silica based material is a silica gel particle.
5. (Original) The matrix of claim 4, wherein the silica gel particle is paramagnetic.
6. (Original) The matrix of claim 4, wherein the silica gel particle is porous.
7. (Original) The matrix of claim 4, wherein the silica gel particle is non-porous.
8. (Original) The matrix of claim 1, wherein the cap further comprises an aromatic hydrocarbon ring.

9. (Original) The matrix of claim 8, wherein at least one member of the aromatic hydrocarbon ring is the amine with a pK of less than about 9.
10. (Original) The matrix of claim 9, wherein the aromatic hydrocarbon ring is selected from the group consisting of pyridine, and imidazole.
11. (Amended) The matrix of claim 1, wherein the amine with a pK of less than about 9 has a pK of at least about 4 and up to about 6.
12. (Canceled)
13. (Original) The matrix of claim 1, wherein the spacer alkyl chain comprises two (2) to five (5) carbon atoms.
14. (Original) The matrix of claim 1, wherein the spacer is selected from the group consisting of cysteine and alanine.
15. (Original) The matrix of claim 1, wherein the aromatic hydrocarbon covalently linked to the spacer define a basic amino acid moiety selected from the group consisting of histidine and histamine.
16. (Original) The matrix of claim 1, wherein the linker alkyl chain comprises three (3) to eight (8) carbon atoms.
17. (Original) The matrix of claim 1, wherein the linker alkyl chain includes at least one member selected from the group consisting of oxygen and amine.
18. (Amended) The matrix of claim 1, wherein the linker is selected from the group consisting of: glycidineglycidyl and urea.
19. (Original) The matrix of claim 1, wherein the matrix is an anion exchanger capable of exchanging with the target nucleic acid at the first pH, and the matrix has a net neutral or negative charge at the desorption pH.

20. (Original) The matrix of claim 1, wherein the desorption pH is at least about 4.0 and up to about pH 10.0.

21. (Original) The matrix of claim 1, wherein the matrix can be reused through at least two cycles of adsorption of the target nucleic acid to the matrix at the first pH and of release from the matrix at the desorption pH.

22 – 100 (Canceled)

101. (Previously presented) The matrix of claim 1, wherein the plurality of ion exchange ligands covalently attached to the solid support has a density of at least about 25  $\mu\text{mol}$  per gram dry weight of the matrix and no greater than about 500  $\mu\text{mol}$  per gram dry weight of the matrix.

102. (Canceled)

103. (Previously presented) A pH dependent ion exchange matrix, comprising:  
a solid support, and  
a plurality of ion exchange ligands, each first ion exchange ligand comprising:  
a cap comprising an amine with a pK of less than about 9;  
a spacer covalently attached to the cap, the spacer comprising a spacer alkyl chain with an amine terminus and an acidic moiety covalently attached to the spacer alkyl chain; and  
a linker comprising a linker alkyl chain covalently attached to the solid support at a first end of the linker alkyl chain and covalently attached to the amine terminus of the spacer at a second end of the linker alkyl chain;  
wherein the matrix has a capacity to adsorb to a target nucleic acid at a first pH, and to release the target nucleic acid at a desorption pH which is higher than the first pH, and  
wherein the cap further comprises an aromatic hydrocarbon ring.

104. (Previously presented) The matrix of claim 103, wherein at least one member of the aromatic hydrocarbon ring is the amine with a pK of less than about 9.

105. (Previously presented) The matrix of claim 103, wherein the aromatic hydrocarbon ring is selected from the group consisting of pyridine, and imidazole.

106. (Previously presented) A pH dependent ion exchange matrix, comprising:  
a solid support, and  
a plurality of ion exchange ligands, each first ion exchange ligand comprising:  
a cap comprising an amine with a pK of less than about 9;  
a spacer covalently attached to the cap, the spacer comprising a spacer alkyl chain with an amine terminus and an acidic moiety covalently attached to the spacer alkyl chain; and  
a linker comprising a linker alkyl chain covalently attached to the solid support at a first end of the linker alkyl chain and covalently attached to the amine terminus of the spacer at a second end of the linker alkyl chain;  
wherein the matrix has a capacity to adsorb to a target nucleic acid at a first pH, and to release the target nucleic acid at a desorption pH which is higher than the first pH, and  
wherein the aromatic hydrocarbon covalently linked to the spacer defines a basic amino acid moiety selected from the group consisting of histidine and histamine.

107. (Canceled)